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BOLOGNA ITALY

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ELEVATED LEDs APPROACH, THRESHOLD, THRESHOLD WING BAR, RUNWAY END AND STOP BAR

LERA

INSTRUCTION MANUAL FOR USE, INSTALLATION AND MAINTENANCE

Compiled by: M. ROMAGNOLI Approved by: M. MAZZOTTI

N° Attachments: Copy n°:

LIMITED PRODUCT WARRANTY

THE FOLLOWING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING, BUT NOT BY WAY OF LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

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(b) any Product which has, in Company's judgement, been subject to negligence, accident or improper storage;
(c) any Product which has not been operated and maintained in accordance with normal practice and in conformity with recommendations and published specification of Company;
(d) the breaking of the warranty seals, if present, determines the immediate termination of the warranty; and,

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IMPORTANT: READ THIS DOCUMENT

Before proceeding to the operations of installation, commissioning, operation, maintenance or disposal, carefully read the entire document.

SAFETY INFORMATION

Extreme caution should be exercised when working with this equipment; it is normally used or connected to circuits that operate at dangerous voltages and can be fatal.
The following section contains important safety information that you must follow when installing and using the apparatus.
Misuse of the equipment or lack of care in applying safety procedures and prescriptions specified in this document, may result in a hazard.
Avoid contact with voltage or current sources.
For no reason the protections and the safety devices must be removed.

OPERATION ON THE EQUIPMENT - SKILLS

Operation on the equipment and access to its internal parts shall be done by experienced personnel, adequately trained and aware of the risks related to electricity and high voltages.
Safety rules shall be adopted when operating on the equipment, or on cables and other apparatus connected to the it

DO NOT OPERATE ON ENERGIZED CIRCUITS

Do not carry out any operation on the converter or on apparatus connected to it when the circuits are energized.

WHEN HANDLING AND SERVICING THIS EQUIPMENT, OBSERVE PRECAUTIONS FOR HIGH VOLTAGE EQUIPMENT

Before any access, inspection or intervention, be sure to have switched-off the unit, opened the main circuit breaker and removed the supply to the unit (by opening the circuit breaker/switch on the distribution board at the beginning of the supply line).

Then wait discharge time (at least 5 minutes), ground carefully the system, and check for voltage presence before accessing..

REANIMATION

The maintenance staff must be aware of the risks related to electricity, criteria to prevent the risk of electric shock and resuscitation techniques

CE MARK

CE This equipment complies with the requirements of European regulations for the CE mark.The user has to respect all prescriptions reported in this document.
This equipment complies with the requirements of the EEC directives 2004/108/EEC and 2006/95/EEC with regard to “Electromagnetic Compatibility” and “Low Voltage Electrical Apparatus” respectively.

OUT OF SERVICE

In case of dismantling, decommissioning, destruction, disposal, the user shall follow all the required precautions for component and material elimination, according to local rules and applicable law.

EDITIONS

Date	
18/12/2014	First issue
19/05/2016	Correct translation errors

REVISIONS

Index	**Date**	**Description**	**Edited by**	**Approved by**

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UC-PU-0315 - LIST OF THE RECOMMENDED SPARE PARTS

1 GENERAL

LERA elevated LED light is high intensity, bidirectional or unidirectional steady burning type.

These fixtures are intended for use as approach (centreline and crossbars), approach side row barrettes, threshold, threshold wing bar and stopbar, in order to provide a visual aid to landing and taxiing aircrafts.

LERA lights are in compliance with:

- ICAO Annex 14 Vol.1
- FAA AC 150/5345-46 and Engineering Brief No67
- IEC TS 61827
- NATO-STANAG 3316.

The fixtures described in this manual are designed to be connected to series circuit, replacing those equipped with incandescent lamps, fed through standard isolation transformers connected to CCR with variable current from 2.8 A to 6.6 A.

Location of these fittings shall be in compliance with ICAO - Annex 14, STANAG 3316 and FAA.

2 MAIN FEATURES

2.1 MAIN COMPONENTS

The fixture consists of:

- body balanced on a special support for proper and accurate horizontal and vertical aiming. The support allows the direct mounting on the breakable coupling or on the top of 60 mm dia supporting pole
- anodized aluminum LED support
- cover to house the LED power supply electronic
- LED power supply electronic resin-embedded inside the cover
- LED module and lens array, housed inside the relevant support
- aluminum breakable coupling, 2” GAS threaded (only for direct mounting)
- cable lead with FAA L-823 plug
- yellow-green wire for grounding purpose.
- All hardware is made of stainless steel.
- See *“Complete P/N identification”* figure for P/N information.

2.2 POWER SUPPLY

- Through 6.6 A series circuit.

CODE	USE	COLOUR	CONSUMPTION
AC	Approach centreline and crossbars	White	38VA
AR	Approach side row	Red	26VA
TG	Threshold	Green	30VA
WG	Threshold Wing Bar	Green	30VA
ER	Runway end	Red	20VA
SB	FAA L-862S Stop bar	Red	20VA
BA	ICAO Stop bar	Red	17VA

Table 1: Use and power consumption

2.3 OPERATING CONDITIONS

- Temperature: - 55°C to +55°C (- 67°F to +131°F)
- Humidity: 0 to 100%

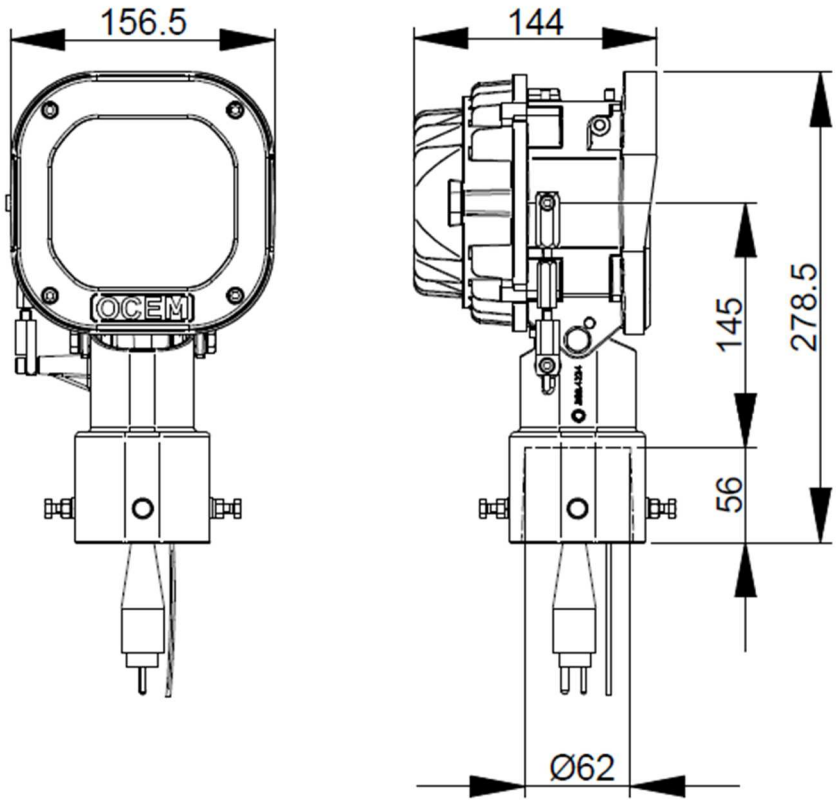


Figure 1: overall dimensions

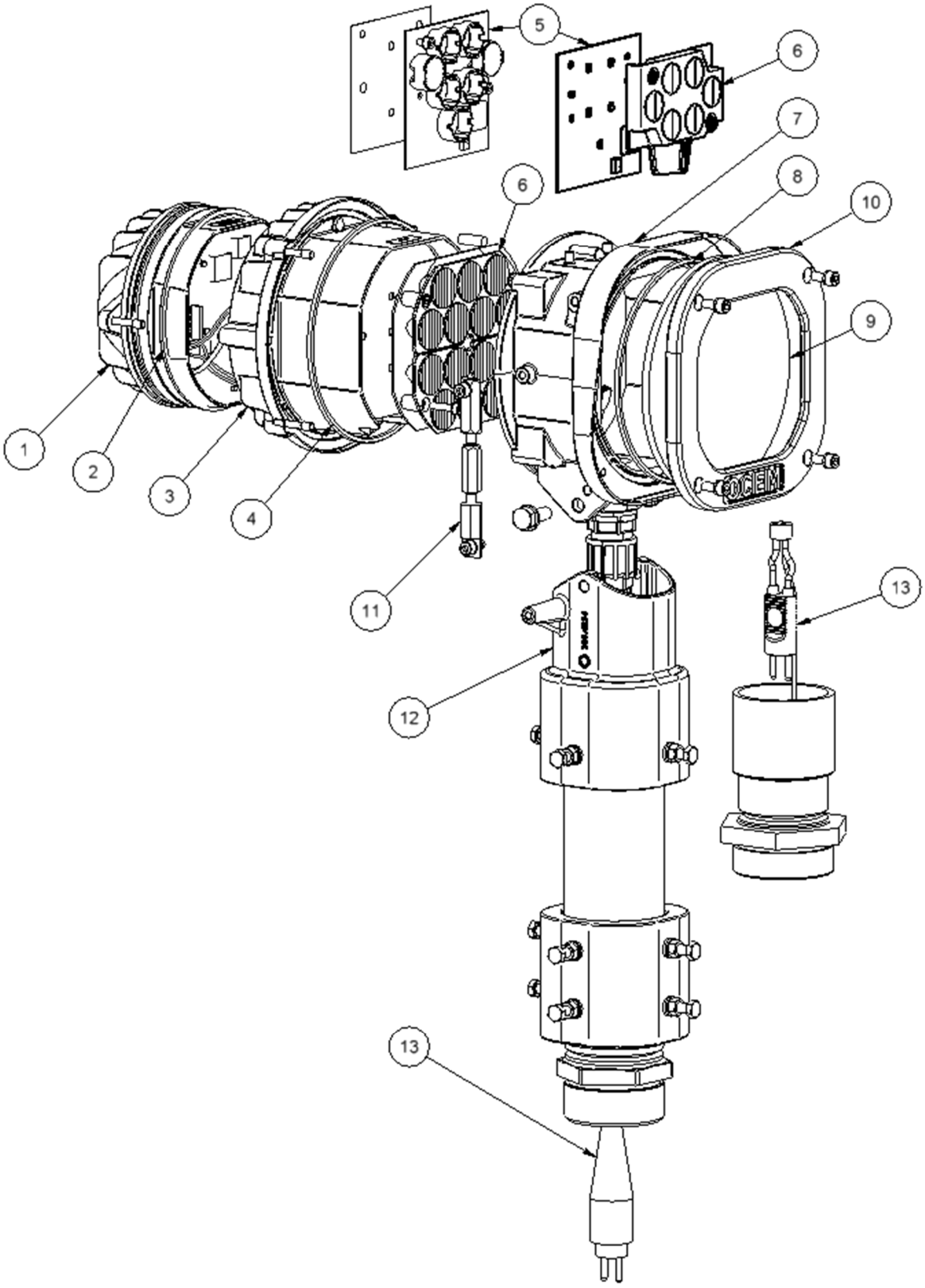


Figure 2: exploded view

Nr.	Description	Qty
1	Cover with resin-embedded electronic	1
2	Cover gasket	1
3	LED module support	1
4	LED module support gasket	1
5	LED module (*)	1
6	Lens array for LED module (*)	2
7	Body	1
8	Transparent front protection gasket	1
9	Transparent front protection	1
10	Transparent front protection holder plate (in the colour of the emitted light)	1
11	Vertical aiming adjusting device	1
12	Special support	1
13	FAA L-823 plug	1
14	Breakable coupling	1

(*) three different versions of the LED modules are available: for stopbar 7 LED module with integrated lenses, for runway end 7 LED module and independent lens array, for the other ones 14 LED module and independent lens array

LERA – AC – P-001 – M – 0

Basic P/N:

Use Code:
(Refer to table A)

Configuration:
P-001 = Fixture complete with breakable coupling
C-050 = Fixture with special support and cable lead (L= 0.5 m)(*)
C-250 = Semi-assembled fixture (AC and AR only)(*) (**)
C-000 = Fixture without cable lead (*)

Monitoring:
0 = Without Monitoring
M = With Monitoring

Arctic kit:
0= Without Arctic Kit

(*) Supporting pole and breakable coupling must be ordered separately
(**)This configuration is provided with special support and cable lead (L = 2.5 m) not assembled

Figure 3: P/N identification

TABLE A

CODE	USE	COLOUR
AC	Approach centreline and crossbars	White
AR	Approach side row	Red
TG	Threshold	Green
WG	Threshold wing bar	Green
ER	Runway end	Red
SB	FAA Stop bar	Red
BA	ICAO Stop bar	Red

3 INSTALLATION INSTRUCTIONS

3.1 FIXTURE INSTALLATION

Three different installation modalities are provided for LEA lights.

- Direct installation on the breakable coupling, normally for threshold, threshold wing bar and runway end lighting. In this case the fixture is supplied completely assembled with breakable coupling and FAA L-823 plug.

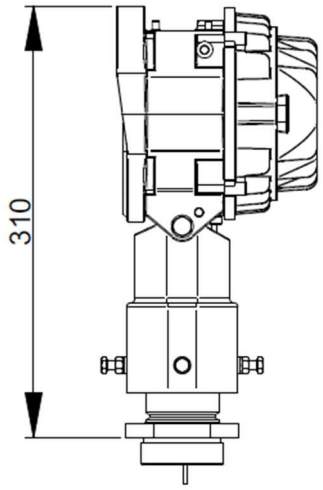


Figure 4: direct mounting

- On the top of a supporting pole with breakable coupling, normally for approach (centreline and crossbars), approach side row barrettes and stop bars.
  In this case the fixture is supplied without supporting pole and breakable coupling, which must be ordered separately.
  The aluminum pole, dia 60 mm, is available of length not exceeding 2 m (four standard lengths are available: 50 cm - 1 m - 1.5 m - 2 m) and must be on-site cut at the proper length depending on the approach profile design.
  The fixture can be supplied assembled complete with FAA L-823 plug (two-single pole wires, 50 cm long), and grounding wire for installation on poles of length not exceeding 30 cm, or semi-assembled, that is two-pole cable lead with FAA L-823 plug, 2.50 m long, not wired to the fixture. The cable lead must be on-site cut at the proper length and then wired to the fixture by means of the special bulkhead connector.
  NOTE: the fixture must not be opened to wire the cable lead with FAA L-823 plug.

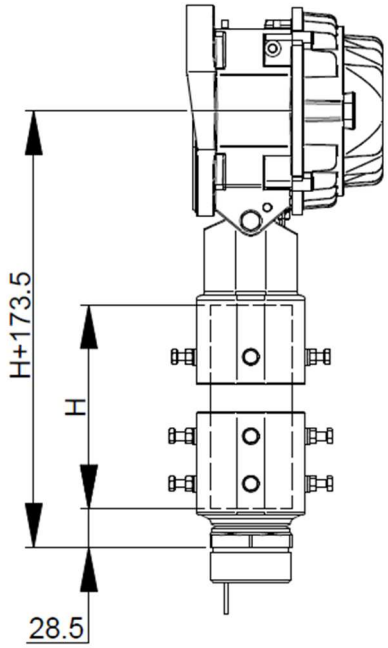


Figure 5: mounting on supporting pole

- On the top of a frangible and lowering mast, normally for approach (centreline and crossbars) and approach side row barrettes.
  In this case the frangible and lowering mast must be ordered separately and the fixture is supplied assembled complete with FAA L-823 plug (two-single pole wires, 50 cm long), and grounding wire.
  On request the fixture can be supplied without cable lead with plug and grounding wire, which have to be separately purchased of the proper length.

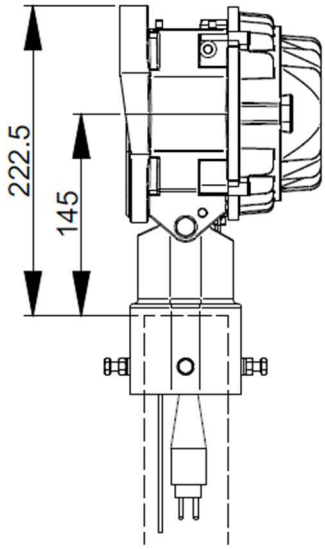


Figure 6: mounting on frangible and lowering mast

Take as reference para. 3.3 which provides the instructions to realize the **external wiring** of the two-pole cable lead with FAA L-823 plug.

3.2 CIVIL WORKS

Each light is usually installed on a suitable concrete block, into which a pipe elbows is cemented. The isolating transformer is housed into a separate concrete pit which is normally placed close the above concrete block (Figure 7).

The pit can be placed far from the concrete block too, but in this case a suitable cable duct has to be provided between the pit and the pipe elbow for passing the secondary cable.
As alternative the assembly pit-pipe elbow can be replaced by a steel sheet base, which can be used to house the isolating transformer, complete with an upper steel plate with a threaded sleeve.
A suitable concrete block has to be provided in case of installation on frangible and lowering mast. To house the isolatin transformer follow the suggestions given before.

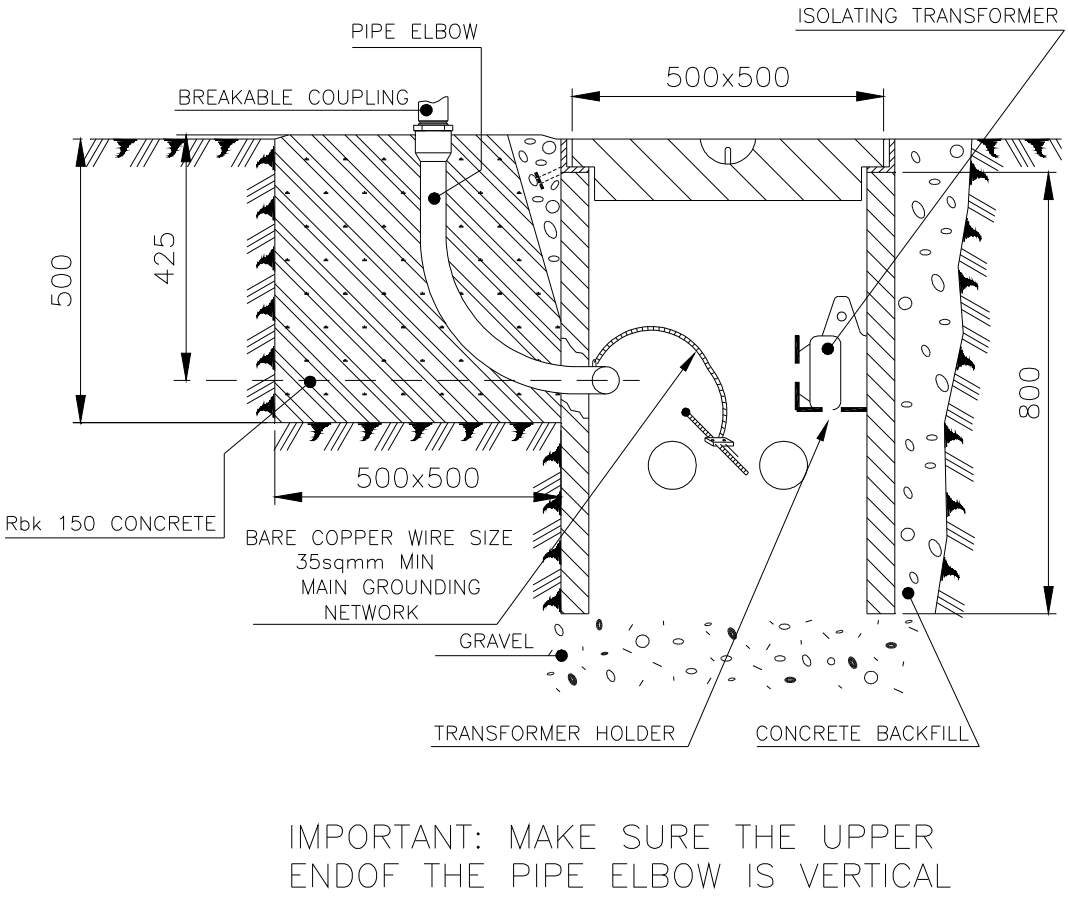


Figure 7: civil works

3.3 EXTERNAL WIRING OF THE TWO-POLE CABLE LEAD WITH L-823 PLUG

ATTENTION

Installation and starting must be carried out by skilled personnel only and following the specific local rules!

The cable can be wired only when the fixture is **not powered!**

The bulkhead connector can be reused for a maximum of ten times using the same conductor size.

The two wires of the cable lead must be connected exclusively to the terminals **1** and **2**. The numbers re stamped on the wall of the internal body of the bulkhead connector.

When the LERA fixtures are supplied “semi-assembled”, it is necessary to wire the cable lead with L-823 plug, once cut at the proper length, to the fixture by means of the bulkhead connector and then complete the mechanical assembly.

- Unscrew the external nut of the bulkhead connector from the internal body, provided to fasten the wires, and cut the cable sheath for a length of approx. 40 mm (fig. 8)

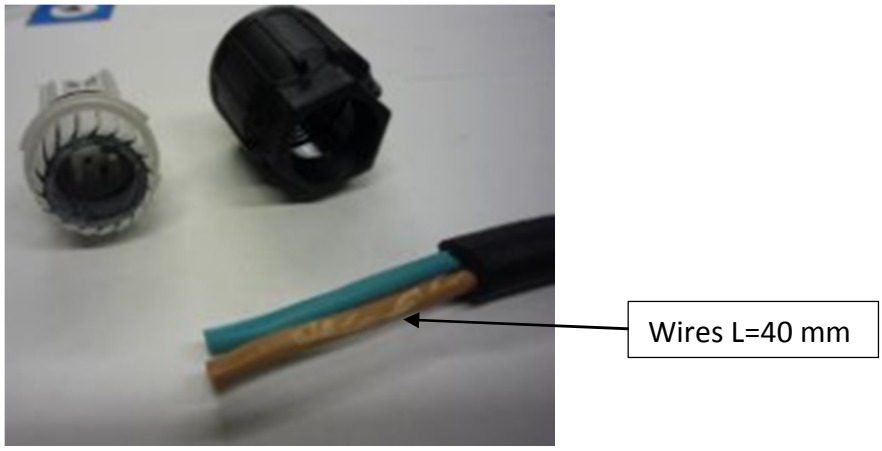


Figure 8: nut and body of the bulkhead connector disassembled

- Insert the cable through the nut and then the gasket of the bulkhead connector body (fig. 9)

Figure 9: cable lead insertion

- Screw, only one turn, the nut to the body. Fit-in the wires of the cable lead into the terminals **1** and **2** (fig. 10).

Figure 10: fit-in wires of the cable lead

- Cut the wires, flush with the body of the bulkhead connector (fig. 11).

Figure 11: wires cutting

- Insert the bulkhead connector nut-body assembly through the special support with vertical aiming adjusting device (Fig. 12).

Figure 12: support with vertical aiming adjusting device

- Tighten the nut-body assembly to the fixed section of the bulkhead connector mounted on the fixture body, in this way providing the electrical connection (tightening torque: 5 Nm) (Fig. 13). Use special tubular wrench 22 mm for bulkhead connector tightening (P/N. 798.0006).

Figure 13: tightening torque

- Complete the mechanical assembly of the fixture. Unscrew from the body the bush with screw, provided for the vertical aiming adjusting device (fig. 14).

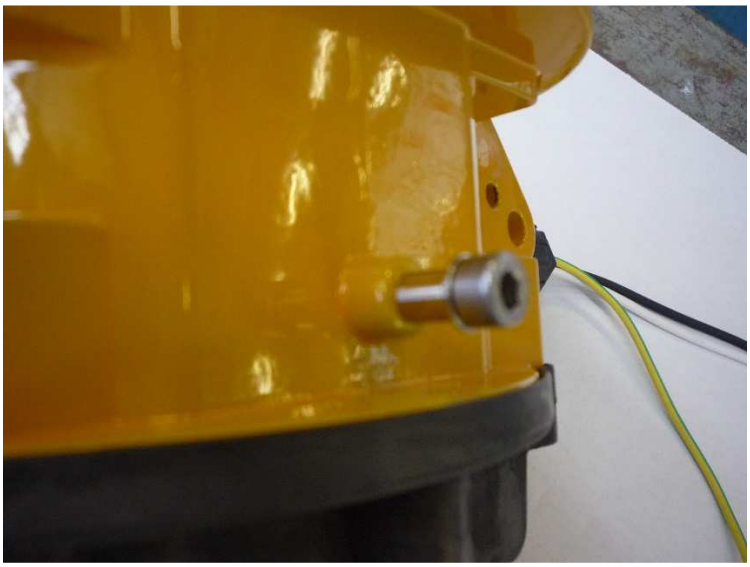


Figure 14: bush with screw

- Assembly the support with vertical aiming adjusting device to the body by means of the two screws with washer, which act as fulcrum; fasten the vertical aiming adjusting device to the body by means the bush with screw before removed. Tighten the two screws with a torque of 5 Nm and the bush screw with a torque of 3 Nm (fig. 15).

Figure 15: final mechanical assembly

- Provide the grounding wiring by means of the suitable external screw, placed at the bottom of the body (fig. 16).

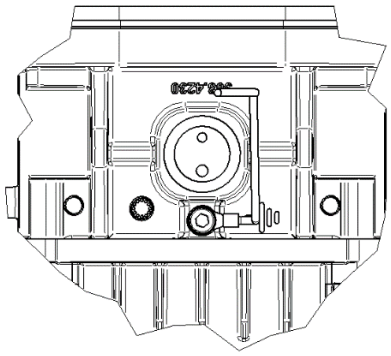


Figure 16: grounding wiring for fixture equipped with two-pole cable lead with plug

3.4 INSTALLING THE LIGH UNIT ON THE PIPE ELBOW AND ELECTRICAL CONNECTION

For the installation of the light with breakable coupling and eventual supporting pole, the following steps are suggested:

- pass together the secondary cable lead with receptacle and a suitable length of grounding wire (grounded inside the pit) through the pipe elbow (or base plate)
- place the receptacle into the upper threaded section of the pipe elbow (or base plate), by holding it between the two plastic rings, and pass the grounding wire through the rings (in correspondence of break point provided on the rings)
- insert the cable lead with plug plus the yellow-green wire through the breakable coupling and the supporting pole, if provided
- connect the fixture grounding wire to the grounding wire coming from the pit (or from the base): splice both the wires and connect them together by using a crimping connector
- connect the light plug to the secondary receptacle inside the pipe elbow (or base plate)
- tighten the breakable coupling into pipe elbow (or the base plate) until coupling bottoms out. Push any extra cable length into the breakable coupling or the breakable coupling+supporting pole, if provided
- set the body on the breakable coupling or on the supporting pole top, if provided, and tighten it by means of the four locking screws
- to aim the fixture in the horizontal and vertical planes, see the document UT-MT-0810.

NOTE
To aim the fixture mounted on a frangible and lowering mast, see the document UT-MT-0811.

4 MAINTENANCE

WARNING
BEFORE ANY MAINTENANCE INTERVENTION, MAKE SURE THE POWER SUPPLY BE SWITCHED OFF.
DO NOT OPERATE ON LIVE PARTS!!!

LED lighting fixtures do not require frequent maintenance. With well-run installations and handling fixture carefully, avoiding excessive falls or collisions, the only maintenance work to be carried out on the field is to clean the glass or equivalent components.

4.1 MAINTENANCE PROGRAM

In order to ensure maximum light fixture life, the installed units should be subject to a maintenance program in accordance with the following instructions and taking as reference the Airport Service Manual ICAO - Part 9 - Airport Maintenance Practices or FAA AC 150 5340-30.

4.1.1 Periodical Checks

Monthly	Cleaning of the transparent front protections
	Correct setting of the lights
Annual	Stability of the civil works
	Stability and assembly of lights
	Electrical connections and insulation degree
	Luminous efficiency of luminous sources
	Condition of all the gaskets
Unscheduled	After unusual atmospheric precipitation, check the light condition and remove any luminous beam obstructions

4.1.2 Snowplow Operations

Snowplow operators should exercise extra care not to strike the light fixtures with snowplow blades. After snow removal operations, inspect all light fixtures to locate and replace, if necessary, any damaged light assemblies.

Recommended snow removal techniques are described in Airport Service Manual ICAO - Part 9 - Airport Maintenance Practices or FAA AC 150/5200-30.

4.2 FIELD INTERVENTIONS: REMOVING AND OPENING THE FIXTURE

WARNING: operate always when the light is not powered.

4.2.1 Fixture removal

If it is necessary to replace the complete fixture, operate as follows:

- remove the light unit from the breakable coupling, from the supporting pole or from the frangible-lowering mast, releasing the locking screws of the support with vertical aiming adjusting device and unscrewing the nut of the bulkhead connector. Remove the external grounding wiring too, when provided. In this way the existing electrical connections can be reused (fig. 17)
- replace the light unit, reconditioning the electrical connections
- aiming the fixture following the instructions of the specific manuals (see para 3.4).

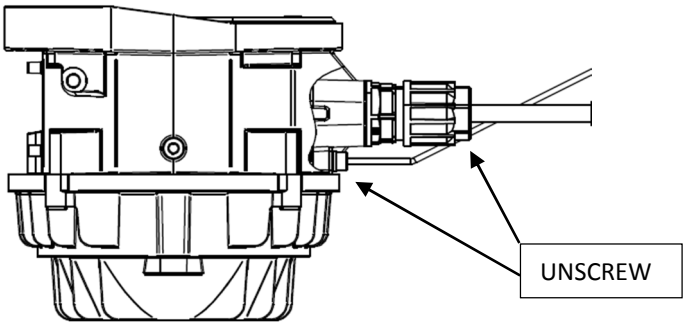


Figure 17: bulkhead connector electrical connection

4.2.2 Opening the light unit

If the light unit is off, it is not necessary replace completely it. In this case it is enough to replace only the electronic cover-LED support assembly and then check inside the maintenance center which is the faulty component.
To remove the
To remove the electronic cover-LED support assembly operate as follows (fig. 18):

- unscrew in the rear side the four captive screws
- pull out the electronic cover-LED support assembly
- disconnect the power supply and grounding wires
- replace the faulty assembly with a new equivalent one
- reconnect the power supply and grounding wires
- screw the four captive screws

NOTE: no new adjustments are necessary.

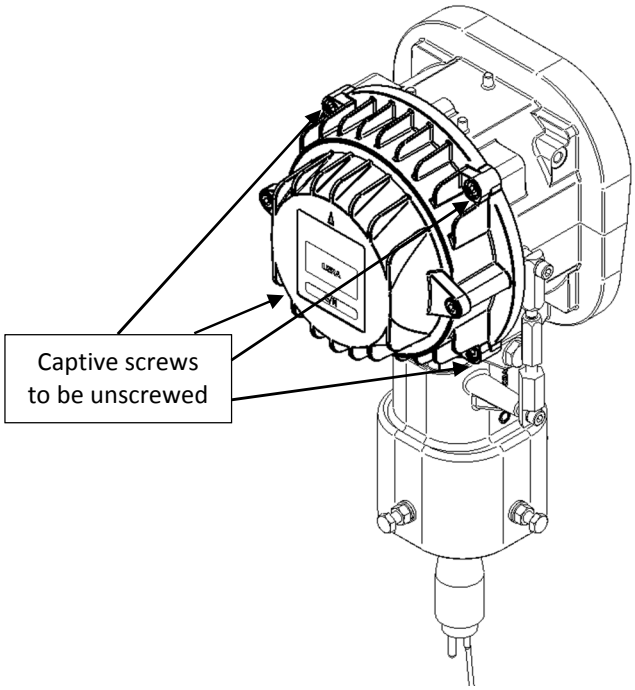


Figure 18: electronic cover-LED support assembly t be removed in bold

4.3 MAINTENANCE CENTER INTERVENTIONS

Here below the interventions to be carry out inside the maintenance center to replace the faulty components, after the receipt of the electronic cover-LED support assembly.

4.3.1 Replacing of the cover with resin embedded electronic

- disconnect the LED module power supply wires at the front (fig. 19)
- unscrew, in the rear side, the two captive screws of the cover (fig. 20)
- replace the cover with resin embedded electronic with a new one and fasten it to the LED module support
- reconnect the LED module power supply wires.

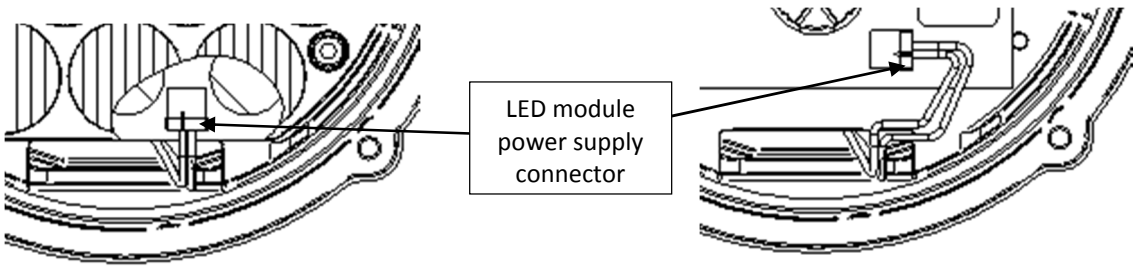


Figure 19: power supply 14 LED module and 7 LED module

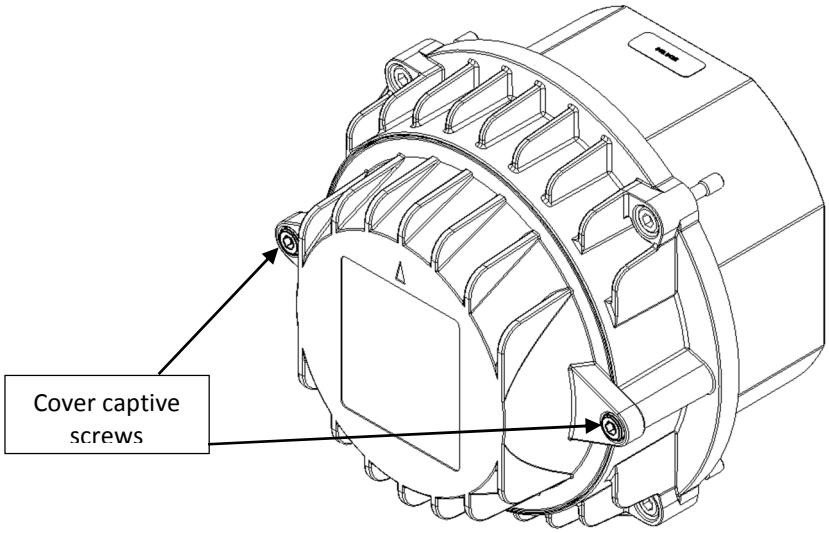
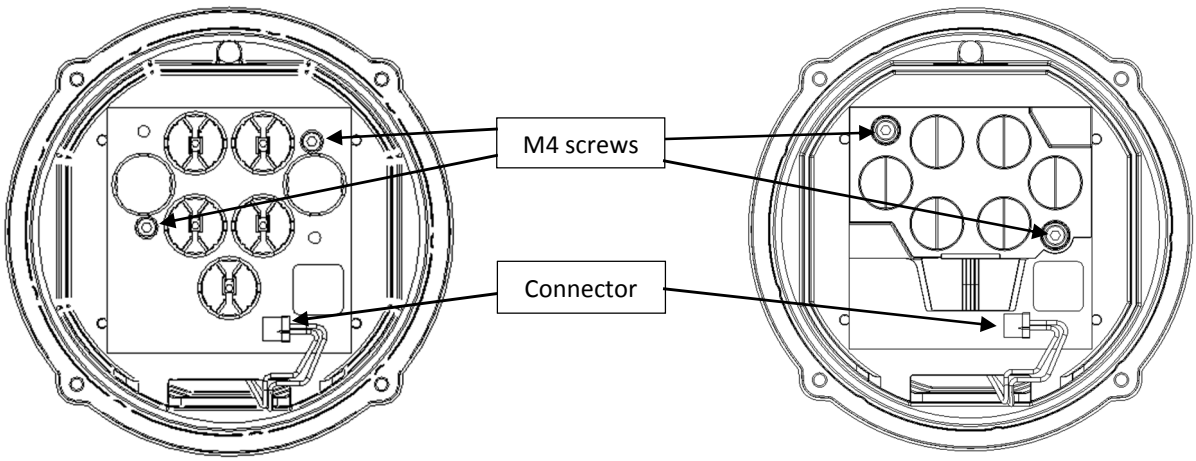


Figure 20: cover with resin embedded electronic to be replaced

4.3.2 Replacing of the led module

7 LED module (fig. 21):

- unscrew the two M4 screws
- disconnect the LED module power supply wires
- replace the faulty LED module and reconnect the power supply wires
- fasten the new LED module to the support by means of the two M4 screws.



LERA stopbar version *LERA Runway end version*

Figure 21: 7 LED module

14 LED module (fig. 22):

- unscrew the two pairs of M4 screws which lock both the two lens arrays and the LED module, and then the central screw
- disconnect the LED module power supply wires
- replace the faulty LED module and reconnect the power supply wires
- set the LED module by means of the central screw (don't tighten the screw)
- set the two lens arrays by means of the four M4 screws
- tighten the central screw.

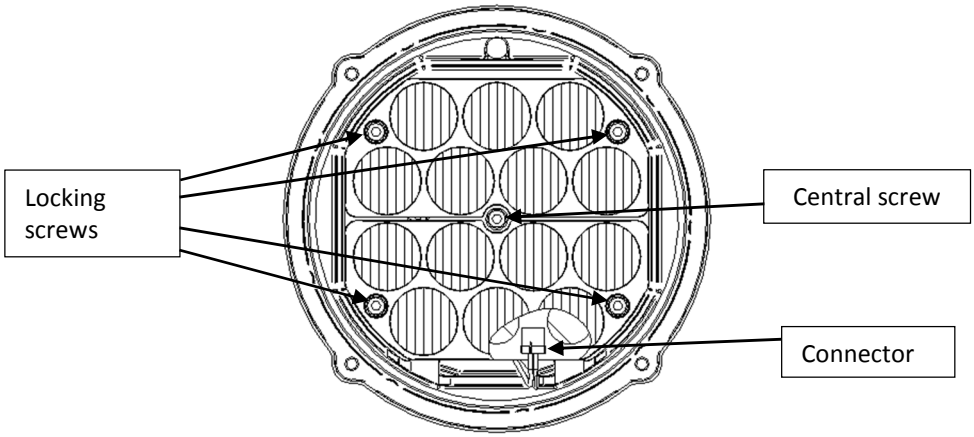


Figure 22: 14 LED module

4.3.3 Replacing of the cable lead with plug

If it is necessary to replace the cable lead with plug, the complete fixture must be removed including the faulty cable lead.
For the fixture equipped with two-pole cable lead take as reference the para 3.3.
For the fixture equipped with two single-pole cables, follow the here below instructions.

- if the cable lead with plug must be removed for its replacing, the bulkhead connector nut must be completely unscrewed and the nut-internal body assembly removed using a screwdriver (blade width 3 - 4 mm)
- unscrew the nut by the internal body locking the wires, make free them and removed the faulty cable lead (fig. 23).

Figure 23: bulkhead connector internal body and nut

- insert the new cable leads with plug and the grounding wire through the bulkhead connector nut, and the through the grommet with three holes. Pull the wires for approx. 40 mm in respect to the grommet (fig. 24).

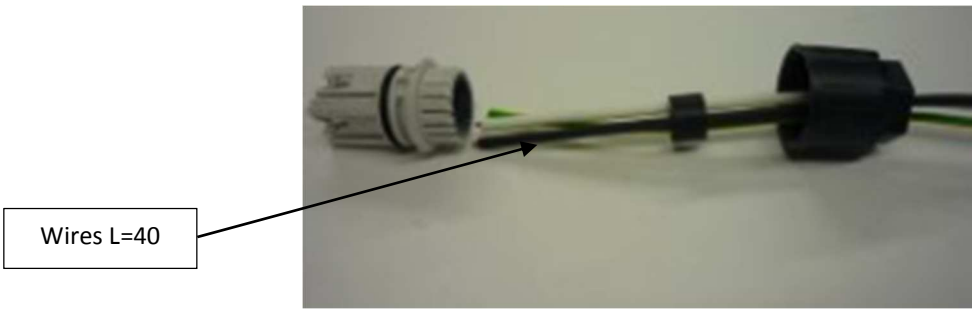


Figure 24: wires pulled through the grommet

- place the grommet complete with wires inside the bulkhead connector internal body (fig. 25)

Figure 25: grommet placed inside the internal body

- screw, only one turn, the nut to the body. Fit-in the wires of the cable lead into the terminals **1** and **2** and the grounding wire into the terminal with the **grounding mark** (fig. 26-27).

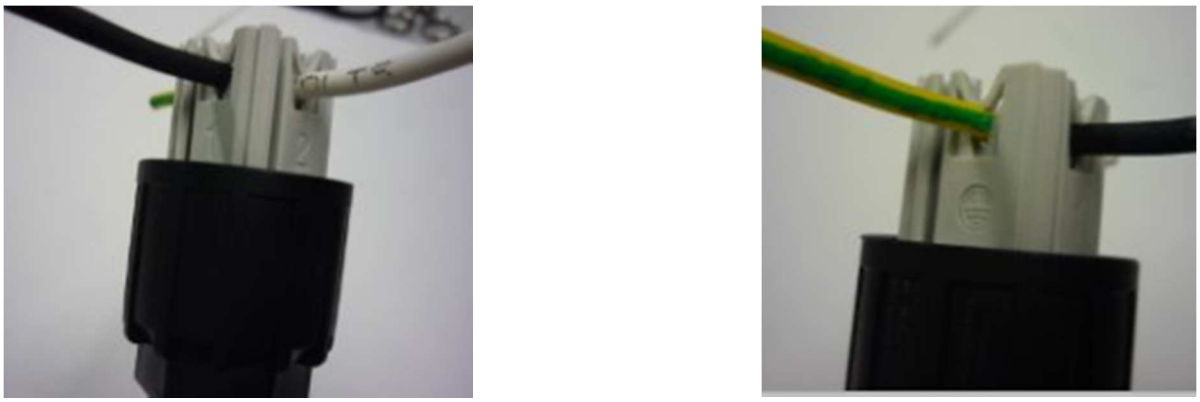


Figure 26: wires fitted-in

Figure 27: wires fitte-in – top view

- cut the wires, flush with the body of the bulkhead conne (fig. 28)

Figure 28: wires cutting

- tighten the nut-body assembly to the fixed section of the bulkhead connector mounted on the fixture body, in this way providing the electrical connection (tightening torque: 5 Nm) (Fig. 29). Use special tubular wrench 22 mm for bulkhead connector tightening (P/N. 798.0006)

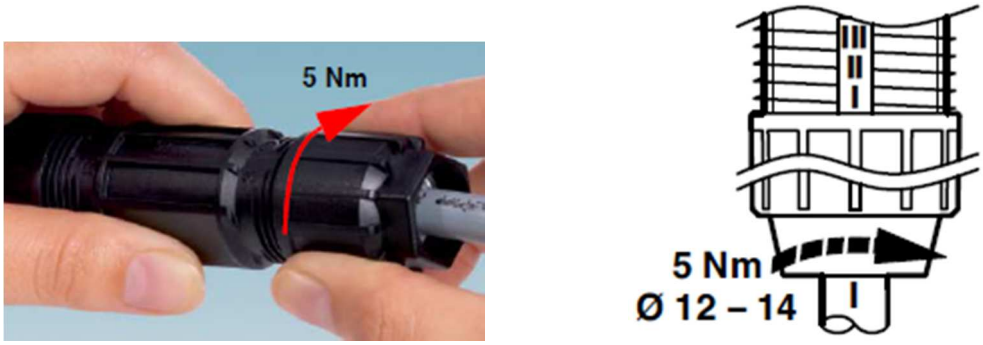


Figure 29: tightening torque

4.4 MONITORING

The fixture can be provided with the monitoring option. This device allows to show at the constant current regulator as if the fixture circuit was open when at least 25% of LEDs are faulty. The fixture thus acts as a traditional lamp fixture.
When the fixture has a bad operation, the internal monitoring device disconnects definitively the unit from the series circuit; after this operation to restore the normal operation of the fixture it's necessary to replace the LED board and unlock the monitoring device. For this operation it is necessary to follow the following steps:

- insert the jumper JM1 on the relevant terminals (fig. 30)
- make sure that the LED module is wired
- power supply the electronic through a CCR set at 4.1 A (3rd step)
- wait for the switch off of the D13 LED (fig. 30)
- turn off the CCR
- REMOVE THE JM1 JUMPER
- turn on the
- CCR and verify the proper operation of the fixture.

Figure 30: monitoring restoring

4.5 TROUBLESHOOTING

Problem	Possible cause	Solution
Distorted light beam output	Broken or damaged lens	Replace lens
Weak light output e	Primary loop with partial short circuit	Check cable assembly
	Defect in the isolation transformer	Replace transformer
	More than 25% LED in short circuit (only without the monitoring option)	Replace the LEDs board
	Wrong power PCB installed	Check parts list and install the correct PCB
Luminous source not working	LEDS DEFECTIVE	Replace the LEDs board
	POWER PCB DEFECTIVE	Replace the Power PCB
	No connection of primary circuit	Check transformer output current with A-meter
	Defective isolation transformer or secondary wiring	Check power line between the light fixture and the transformer, including connectors
	Monitoring device locked (only if this option)	Unlocked monitoring device
Water or moisture inside the fixture	Lens gasket	Replace the gasket
	Pinched fixture power cables	Replace fixture leads